Molecular signatures of quiescent, mobilized and leukemia-initiating hematopoietic stem cells.

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Public Summary:

Scientific Abstract:
Hematopoietic stem cells (HSC) are rare, multipotent cells capable of generating all specialized cells of the blood system. Appropriate regulation of HSC quiescence is thought to be crucial to maintain their lifelong function; however, the molecular pathways controlling stem cell quiescence remain poorly characterized. Likewise, the molecular events driving leukemogenesis remain elusive. In this study, we compare the gene expression profiles of steady-state bone marrow HSC to non-self-renewing multipotent progenitors; to HSC treated with mobilizing drugs that expand the HSC pool and induce egress from the marrow; and to leukemic HSC in a mouse model of chronic myelogenous leukemia. By intersecting the resulting lists of differentially regulated genes we identify a subset of molecules that are downregulated in all three circumstances, and thus may be particularly important for the maintenance and function of normal, quiescent HSC. These results identify potential key regulators of HSC and give insights into the clinically important processes of HSC mobilization for transplantation and leukemic development from cancer stem cells.